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ABSTRACT

A 32-item Computer Self-Efficacy Scale (CSE) was developed to measure perceptions of capability regarding specific computer-related knowledge and skills. Bandura's theory of self-efficacy (1986) and Schunk's model of classroom learning (1985) guided the development of the CSE. Each of the skill-related items is preceded by the phrase "I feel confident." A five-point Likert-style response format was used. Data from 414 subjects who were learning to use computers in three settings were used to conduct analyses for assessing the reliability and construct validity of the instrument. The subjects included graduate students, adult vocational students, and nurses. Data were collected on beginning level self-efficacy, advanced level self-efficacy, mainframe self-efficacy, and willingness to exert effort. A principal factor analysis with oblique rotation produced a conceptually meaningful three-factor solution with high alpha reliabilities. Additional analyses provided some support for the theoretical propositions of self-efficacy, but suggested that the males and females in this study differed in judgments of their computer capability. Research using actual measures or observations of performance, effort expenditure, and persistence are needed to continue the exploration of the predictive validity of the three types of efficacy judgments generated by the CSE. Nine tables and one flowchart are included. (TJH)

Assessment of Computer Self-Efficacy: Instrument Development and Validation

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Abstract

A 32-item Computer Self-Efficacy Scale (CSE) was developed to measure perceptions of capability regarding specific computer-related knowledge and skills. Data from 414 individuals who were learning to use computers in three settings were used to conduct analyses for assessing the reliability and construct validity of the instrument. A principal factor analysis with oblique rotation produced a conceptually meaningful 3-factor solution with high alpha reliabilities. Additional analyses provided some support for the theoretical propositions of self-efficacy but suggest that the males and females in this study differed in judgments of their computer capability.

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Introduction

The mastery of computer technology can provide individuals with skills that are highly valued by employers in various types of businesses, industries, and services. The introduction of computer technology into a variety of work settings has, in turn, been accompanied by a proliferation of computer courses in elementary, secondary, and postsecondary curricula. Understanding more about how individuals come to feel capable about using computers and the assessment of their skills can provide a foundation for specific strategies that may be helpful to educators striving to develop computer literacy among students.

Much of research to date has focused on the development of attitudes toward using computer technology. Studies have been conducted and results have indicated that positive attitudes toward computers are related to quality of work life (Gattiker, 1985) and perceptions of the usefulness of computers (Arndt, Clevenger, & Meiskey, 1985). Additional studies have found that computer attitudes are influenced by accessibility and prior use of computers in classroom and work settings (Bitter & Davis, 1985; Coover, Delcourt & Gable, 1988; Loyd & Gressard, 1984; Nickell, 1987).

While such studies have been helpful to educators in the planning and evaluation of computer-related instructional programs, they have offered little in terms of the specific assessment of group needs prior to instruction, or in the assessment of specific computer-related group skills after instruction. The instrument presented herein is an attempt to go beyond the popular focus on computer attitude measurement by assessing the degree of confidence individuals have regarding computer-related knowledge and specific skills. The major objectives of the this paper are to describe the development of the Computer Self-Efficacy Scale (CSE) and present some preliminary evidence in support of its reliability and construct validity.

Self-Efficacy Theory

Bandura's theory of self-efficacy (1986) and Schunk's model of classroom learning (1985) guided the development of the Computer Self-Efficacy Scale. Self-efficacy theory proposes that individuals who judge themselves as capable (efficacious) to perform certain tasks or activities will tend to attempt and successfully execute them. Of central importance in self-efficacy theory is the concept of self-referent thought. Regarding the importance of self-referent thought Bandura states "among the forms of self-referent thought that affect action, none is more central or pervasive than a person's judgments of his or her capability to deal with continuously changing realities" (1986, p. 124).

Self-efficacy is defined as an estimation of one's ability to successfully perform target behaviors to produce outcomes (Bandura, 1986). Bandura draws an important distinction between efficacy expectations regarding the ability to perform and outcome expectations which result from actual performance. This distinction, as well as antecedents and consequences of perceived self-efficacy, are depicted in Schunk's model of motivated classroom learning (see Figure 1.)

How do individuals come to render judgments of self-efficacy? Bandura (1986) suggests that there is a dynamic interplay among self-referent thought, action, and affect. Individuals obtain efficacy information or cues from various sources and use this information to

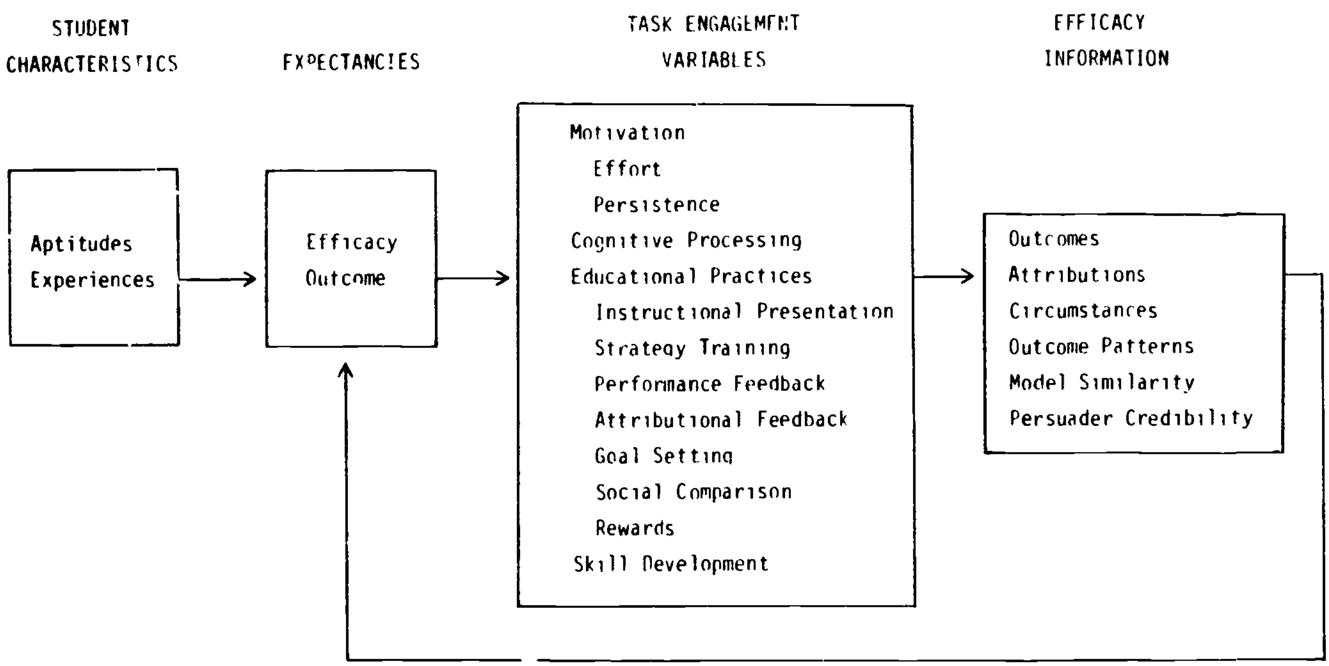

Figure 1. A model of motivated classroom learning of cognitive skills. (Adapted from Schunk, 1985)

render judgments of efficacy which may be either faulty or accurate. The four sources of efficacy information, in order of the potency of their effect, include: performance accomplishments, vicarious learning experiences, verbal persuasion, and affective arousal. This information is weighed and combined by the individual to generate self-appraisals of capability. Such appraisals then operate as "cognitive mediators of action" (Bandura, 1986). As a result, individuals will attempt or not attempt, succeed or fail to succeed at specific tasks and activities. In general, individuals will tend to attempt and successfully execute tasks that fall within their range of efficacy, but shun or fail those perceived to be unmanageable. Research has shown that self-percepts of efficacy influence choice of activities and environmental settings, effort expenditure, and persistence regardless of whether such appraisals are faulty or accurate (Bandura, 1986; Schunk, 1985).

According to Bandura (1986), efficacy expectations vary on several dimensions that have important implications. For example, they can differ in magnitude when tasks are ordered according to level of difficulty. In such a situation, the efficacy of individuals could be confined to the simpler tasks only, extend to more difficult ones, and/or include some of the most difficult tasks. Efficacy expectations may also vary according to strength. Individuals who possess a robust sense of efficacy will generally persevere in their coping efforts despite occasional disconfirming experiences. Lastly, efficacy expectations may vary in generality. Some experiences create limited expectations while others instill a generalized sense of efficacy which can have a carry-over effect as the individual proceeds to different tasks and situations. Bandura (1986) thus urges a meaningful expectancy analysis which includes a precise and detailed assessment of all three dimensions.

When such detailed efficacy assessments are made, a high correspondence between self-efficacy judgments and subsequent performance is often found (Bandura & Adams, 1977; Bandura, Adams & Beyer, 1977; Schunk, 1981). The goodness-of-fit between perceived self-efficacy and subsequent performance is so striking that Rosenthal (1978) believes it should give impetus to studies of analogous relationships between mediating cognitions and their action sequences in a diversity of situations and skill domains.

Measurement of Self-Efficacy

Bandura (1986) has conceptualized self-efficacy as particularized self-percepts which can vary across activities and situational circumstances rather than a global disposition which can be assayed by an omnibus test. Hence, attempts to measure self-efficacy with regard to specific activities or circumstances have demonstrated more predictive power regarding such variables as task preference, effort expenditure, and persistence (Schunk, 1987). The notion of a differentiated construct rather than a global one provided the foundation for the assessment of specific computer-related skills described in this study. As Schunk (1987) has pointed out, the idea of differentiated conceptions has permeated much of the more recent thinking about such constructs as intelligence and self-concept. The multi-dimensional nature of self-concept suggests that subject-specific self-concept constributes to academic self-concept, which in turn contributes to general self-concept (Marsh & Shavelson, 1985).

Recent work by Owen (1986) suggests that self-efficacy can be easily and reliably measured and that it can be used to assess aspects of affect, cognition, and performance in the attainment of program and course objectives. Measurement of the construct is thus facilitated by the identification of a clearly defined set of skills. Instruments developed in such a manner may then be useful for assessing pre and post instruction skills attainment. Such assessment would provide specific information regarding which skills should be emphasized during instruction.

Development of the Computer Self-Efficacy Scale

Forty-two items were generated after a careful analysis of the skills emphasized in three different courses designed to teach graduate students and practicing professionals how to use both the micro- and mainframe computer. A draft of these items was then submitted to a panel of experts (n=5) who teach various computer courses. The experts were asked to consider the content of the item, the level of difficulty, and overall comprehensiveness of the scale. Results of the expert review were then used to revise the original items and shorten the form to 32 items.

Each of the skill-related items is preceded by the phrase "I feel confident." A 5-point Likert-type response format was employed and respondents were asked to indicate the degree to which they felt very little confidence (1) to quite a lot of confidence (5). All items were positively worded statements that reflected a variety of computer-related skills and knowledge. High scores indicate a high degree of confidence or capability with regard to using computers. Additional questions were also included to ascertain sources of efficacy

Table 1

Selected Characteristics of Study Sample

Variables	N	Freq. (f)	Percent (%)	Variables	N	Freq. (f)	Percent (%)
Age:	420			Prior Computer Use:	415		
18 - 25 years		92	22	Yes		381	92
26 - 33 years		124	30	No		34	8
33 - 39 years		103	25	Type of Computer Used:	379		
40 - 49 years		83	20	Personal Computer		140	37
50 - 59 years		18	3	Mainframe		172	45
				PC & Mainframe		67	18
Gender:	423			Word Processing	399	304	76
Females		312	74	Data-Base Management	398	124	31
Males		111	26	Statistical Procedures	399	128	32
Employed:	420			Spreadsheets	398	114	29
Yes		354	84	Educational Software	399	149	37
No		66	16	Videogames	399	157	39
Educational Level:				Programming	399	107	27
High School Grad		17	4				
AD/AS Degree		14	3				
RN Diploma		31	8				
BA/BS Degree		216	51				
MA/MS Degree		136	33				
EdD/PhD Degree		0	0				

information for use in exploring some of the theoretical propositions of self-efficacy theory.

Methods, Procedures, and Data Sources

Graduate students, adult vocational students, and professionals (nurses) learning to use computers in three different settings participated in the study. Descriptive statistics for the study sample are displayed in Table 1. A total of 414 individuals was used to conduct preliminary analyses at this early stage of instrument development. Specific analyses included: principal factor analysis, reliability, MANCOVA, and hierarchical multiple regression analysis.

Results

Factorial Validity and Reliability

Principal factor analysis with oblique (direct quartimin) rotation produced a 3-factor solution which explained 92% of the systematic covariance among the 32 CSE items. Table 2 displays the factor loadings and associated alpha reliability estimates obtained for each of the three factors. Factor I accounted for most of the covariance (76%) and consisted of 16 items with loadings ranging from .52 to .91. The items defining this factor represent a beginning level of computer skills (e.g., getting the software up and running) and are so named. This factor is strongly correlated with Factor II ($r=.72$) which accounted for a lesser amount of covariance (10%) and was defined by 13 items. (See Table 3 for factor intercorrelations.) These items had loadings ranging from .35 to .99 and reflect higher-level more conceptual skills (e.g.,troubleshooting computer problems). Factor III explained only a small amount of covariation (6%) and was defined by three items with

Table 2

Principal Factor Analysis and Associated Reliability Estimates for Computer Self-efficacy Scales (Oblique Direct Quartimin Rotation) N=414

Factor	Item Number	Stem	Loading	Alpha
I Beginning Level Computer Skills	20	Adding and deleting information from a data file	.91	
	7	Escaping/Exiting from the program/software	.89	
	19	Copying an individual file	.86	
	18	Copying a disk	.85	
	15	Making selections from an on-screen menu	.84	
	21	Moving the cursor around the monitor screen	.82	
	17	Using a printer to make a "hard-copy" of my work	.80	
	23	Using the computer to write a letter or essay	.78	
	12	Handling a floppy disk correctly	.78	
	6	Entering and saving data (numbers or words) into a file	.78	
	27	Storing software correctly	.77	
	30	Getting rid of files when they are no longer needed	.75	
	1	Working on a personal (micro-computer)	.75	
	2	Getting the software up and running	.73	
	9	Calling-up a data file to view on the monitor screen	.72	
	31	Organizing and managing files	.52	.97
II Advanced Level Computer Skills	28	Explaining why a program (software) will or will not run on a given computer	.99	
	32	Troubleshooting computer problems	.81	
	22	Writing simple programs for the computer	.76	
	24	Describing the function of computer hardware (keyboard, monitor, disk drives, computer processing unit)	.73	

Table 2 (continued)

Factor	Item Number	Stem	Loading	Alpha
II (Continued)	10	Understanding terms/words relating to compute[illegible] hardware	.73	
	11	Understanding terms/words relating to computer software	.62	
	25	Understanding the three stages of data processing: input, processing, output	.60	
	1[illegible]	Learning to use a variety of programs (software)	.56	
	26	Getting help for problems in the computer system	.55	
	14	Learning advanced skills within a specific program (software)	.55	
	29	Using the computer to c[illegible]anize information	.45	
	16	Using the computer to analyze number data	.35	.96
III Mainframe Computer Skills	3	Logging onto a mainframe computer system	.88	
	8	Logging off the mainframe computer system	.86	
	4	Working on a mainframe computer	.83	.92

Table 3

Intercorrelations for E rically Derived Factors (N=411)

	FACTOR		
Factor	I	II	III
I	1.000	.719	.289
II		1.000	.408
III			1.000

loadings ranging from .83 to .88. These three items clearly reflect mainframe computing skills. Six items loaded on more than one factor but are presented for the factor on which the loading was highest. The alpha reliabilities for the three empirically derived factors were .97, .96, and .92, respectively.

Known Groups Analysis

There is considerabl evidence that in certain areas efficacy expectancies are higher for males than for females, particularly when the tasks or skills involved are perceived in stereotypical ways. Schunk and Lilly (1984) found that when tasks are perceived as "masculine," gender differences in efficacy judgments occur. In addition, some of the studies of computer attitudes have also noted gender differences in attitudes; although about an equal number of studies have not found such differences (Bandalos & Benson, 1988; Barker, 1985; Chen, 1986; Collis, 1987). Because computer skills might be viewed as traditionally masculine and because of the mixed results in attitudinal research, we wondered whether there might be gender differences among the participants in this study.

For a different, and more condensed perspective on the data, a 2 x 2 MANCOVA was conducted. The independent variables were sex and age. Age was given two levels--young and old--by a 3-way split with the middle group excluded. Thus, "young" was defined as age 34 or younger; "old" was age 44 or older. The covariate was the single item computer use question, and the outcome variables were the three CSE factor subscales.

While computer use proved ineffectual as a covariate, it was left in the analysis becau. of ample degrees of freedom. The main effect for sex was significant, however (Hotelling T-squared=6.09, df 3/229, p=.0005). Univariate follow-up tests showed sex differences on both Factor II (advanced skills) and Factor III (mainframe skills) (t=3.95, p=.0001; t=2.21, p=.028, respectively. For both factors, males showed higher self-efficacy beliefs (Factor II, x=3.55 vs. 2.88; Factor III, x=3.36 vs. 2.64)[a]. Translating these differences to approximate effect sizes, the average male in this sample stands at about the 75% percentile in the female distribution of self-efficacy scores. As we shall see, these results are reinforced in the subsequent regression analyses.

Criterion-Related Validity

To explore some of the propositions of self-efficacy theory, we collected additional data from participants. Since it was not feasible to collect actual performance data or measure actual effort expenditure in this study, we collected data on the perceptions of respondents regarding task difficulty, personal control, ability to learn how to use computers, and willingness to exert effort. Consequently, respondents' scores on each of these single item perceptions served as predictor variables in three hierarchical regression analyses. Scale scores on the three types of efficacy judgments or expectations (Factors I, II, III) served as the dependent variables.

[a] Due to exclusion of the middle age group, the means for males and females in this analysis were different than those obtained in the regression analyses.

Beginning Level Self-Efficacy. Based upon Bandura's theory and Schunk's model, variables in this analysis were entered in two blocks. Learner characteristics (age; sex; educational level) were entered first because these are considered precursors to efficacy expectations. This block of variables was followed by sources of efficacy information which influence efficacy expectations through a feedback loop (see Figure 1). Variables in this block included previous computer use, perceptions of task difficulty, ability to learn, and personal control. The results of this analysis are summarized in Table 4. Note that, as a group, the precursor variables explained only a small amount of the variability in beginning level computer self-efficacy. The only significant predictor at this step was sex ($t=-3.48$, $p=.0006$). The magnitude and direction of the beta weight (-.442) suggest that the females in this sample judged themselves as less efficacious regarding beginning level skills than did the males.

When the block of variables representing efficacy information was entered into the analysis, however, an additional 31% of the variability in beginning level self-efficacy was explained. Prior computer use, perception of task difficulty, and perception of ability to learn were significant predictors indicating that the previous experiences and perceptions of respondents combined in some manner to render judgments of computer self-efficacy. Degree of personal control, however, did not contribute to the efficacy judgments of those in this sample.

Advanced Level Self-Efficacy. Blockwise entry of variables in this analysis was identical to that described above for beginning level self-efficacy.

Table 4

Hierarchical Multiple Regression Results for Prediction of Beginning Level Skills (N-419)

Variables Entered At Each Step	b	Se b	Beta	Constant	R	Adjusted R^2 R^2	SEE	tb
Precursor Variables								
Sex [a]	-.442	.126	-.177					-3.48*
Age	-.006	.006	.053					-1.07
Ed. Level	.005	.054	.004	4.112	.179	.025 .032	1.100	.08
Efficacy Information								
Perception Task Difficulty	.172	.048	.150					3.55*
Prior Computer Use	1.580	.176	.381					8.93*
Perception of Ability to Learn	.394	.060	.314					6.56*
Perception Control	-.098	.059	-.079	.624	.594	.340 .352	.909	-1.68

[a] Coding for Sex = Male (0); Female (1)

* $p < .001$

Table 5

Hierarchical Multiple Regression Results for Prediction of Advanced Level Skills (N-420)

Variables Entered At Each Step	b	Se b	Beta	Constant	R	R^2 / Adjusted R^2	SEE	tb
Precursor Variables								
Sex[a]	-.692	.112	-.302					-6.160*
Age	-.006	.006	-.053					-1.070
Ed. Level	.005	.054	.004	3.634	.307	.087 .094	.978	.080
Efficacy Information								
Perception Task Difficulty	.023	.043	.022					.5[illegible]1
Prior Computer Use	.792	.158	.209					5.000*
Perception of Ability to Learn	.486	.054	.423					9.060*
Perception Control	-.098	.059	-.079	.8183	.616	.368 .379	.814	-1.680

[a] Coding for Sex = Male (0); Female (1)

* $p < .001$

Table 6

Hierarchical Multiple Regression Results for Prediction of Mainframe Skills (N-393)

Variables Entered At Each Step	b	Se b	Beta	Constant	R	Adjusted R^2	R^2	SEE	tb
Precursor Variables									
Sex[a]	-.229	.052	-.215						-4.355*
Age	-.009	.003	-.167						-3.393*
Ed. Level	.005	.026	.010	2.023	.271	.066	.073	.461	.209
Efficacy Information									
Perception Task Difficulty	-.029	.023	-.059						-1.223
Prior Computer Use	.080	.084	.046						.958
Perception of Ability to Learn	.128	.029	.238						4.422*
Perception Control	-.039	.031	-.067	1.513	.407	.150	.165	.440	-1.241

[a] Coding for Sex = Male (0); Female (1)

* $p < .001$

Summary results of this analysis are displayed in Table 5. Again it can be seen that the block of precursor variables explained little variation (9%) in advanced level self-efficacy. As in the previous analysis, sex was a significant predictor. Explanatory value increased to 37% when the variables representing efficacy information were entered. Previous computer use and perceived ability were both important considerations in rendering judgments of advanced level self-efficacy, while neither perceived task difficulty nor degree of personal control had any influence on these judgments.

Mainframe Self-Efficacy. Blockwise entry of precursor variables and efficacy information variables generated results somewhat different than those obtained for beginning and advanced level skills (see Table 6). In addition to sex, age emerged as a significant predictor of mainframe skills ($t=-3.393$, $p=.0008$) as learner characteristics entered the analysis. Interestingly, only perceived ability to learn was an important influence on efficacy beliefs when sources of efficacy information were entered into the analysis. Perceived task difficulty, previous computer use, and degree of personal control were not sources of useful information regarding mainframe computer skills capability.

Willingness to Exert Effort. An additional analysis was conducted to see if efficacy judgments regarding beginning level, advanced level, and mainframe skills could predict the degree of effort individuals were willing to invest to learn computer skills. Although efficacy expections are known to be excellent predictors of actual effort expenditure (Bandura, 1986; Schunk, 1985) it was not feasible to collect such data. Instead, we asked respondents to indicate to us how hard they were willing to work at using computers, on a scale from 1-5.

Table 7

Hierarchical Multiple Regression Results for Prediction of Willingness to Exert Effort (N=418)

Variables Entered At Step One	b	Se b	Beta	Constant	R	R^2 / Adjusted R^2	SEE	tb
Beginning Skills (I)	-.009	.015	-.052					-.637
Advanced Skills (II)	.075	.018	.363					3.999*
Mainframe Skills (III)	-.006	.008	-.044	1.884	.299	.083 .089	.206	-.768

$p < .001$

The responses to this single item served as the dependent variable and the three efficacy judgments served as predictor variables in this regression analysis. Results presented in Table 7 indicate that as a group these judgments explained only a small amount of the variation in effort (8%). However, efficacy judgments regarding advanced level skills did appear to influence the amount of effort the respondents would be willing to exert to learn the higher level skills. This finding supports the claim of self-efficacy theory that individuals who judge themselves as capable are more willing to invest effort.

Discussion and Conclusions

Principal factor analysis of the 32-item Computer Self-Efficacy instrument generated a conceptually meaningful 3-factor solution, which explained 92% of the systematic covariation among CSE items. In addition, the alpha reliability estimates obtained for each of the empirically derived factors were quite high, indicating that the current form is suitable for research purposes. Indeed, when scale scores based upon the empirical factors were computed and included in subsequent analyses to assess construct validity some interesting results were obtained.

Results of the regression analyses highlighted the relative unimportance of precursor variables as a group, but underscored the importance of efficacy information in rendering computer efficacy judgments. The variables representing efficacy information seemed to combine in different ways to render the three types of efficacy judgments, thus suggesting that scale scores rather than total scores be used to generate meaningful information. Although precursor variables as a group were not influential, gender of respondents was clearly a factor in the analyses. This finding raises intriguing questions about possible differences in the way that the males and females in this sample used efficacy information to judge their capability.

To look a bit more closely at the gender issue, means and standard deviations for selected variables were computed for both the males and females. These values are presented in Table 8. When these values are examined we see little variation in learner characteristics such as age and educational level. In contrast, the values associated with the efficacy information variables reveal some differences between the males and females in this study. While males have somewhat more prior experience in using computers, recall that when prior use was used as a covariate to equate groups in the MANCOVA analysis, this difference was nonsignificant. This is important to note because prior use represents previous performance accomplishments--potent sources of efficacy information. Regarding the perceptual variables, both males and females rated the relative difficulty of using computers and their degree of personal control almost identically and neither of these emerged as important influences on any of the three efficacy judgments. On the other hand, males perceived themselves as more able to learn how to use computers than females (X=4.25; x=4.05). Furthermore, scanning the three means associated with the types of efficacy judgments reveals again that the males consistently judged themselves as more capable. Although gender differences in efficacy judgments have been noted in other studies (e.g., Schunk & Lilly, 1984), little empirical evidence is available to explain the dynamics involved in such findings. Perhaps prior computer accessibility and experiences were qualitatively rather

Table 8

Means and Standard Deviations for Males and Females on Selected Variables

Variable	Females (N=312) $\bar{x}$ (sd)	Males (N=111) $\bar{x}$ (sd)
Age	33.400 (8.50)	33.500 (8.30)
Educational Level (1-6)	4.000 (1.00)	4.300 (.70)
Prior Computer Use	.898 (.30)	.981 (.14)
Perceptions		
Control	1.56 (.82)	1.58 (.81)
Task Difficulty	2.80 (.98)	2.79 (.98)
Ability to Learn	4.05 (.91)	4.25 (.83)
Willingness to Exert Effort	2.05 (.23)	2.05 (.17)
CSE Factors (Subscales):		
I Beginning Skills	3.53 (1.18)	3.97 (.87)
II Advanced Skills	2.75 (1.01)	3.44 (.88)
III Mainframe Skills	1.50 (.47)	1.73 (.45)

Note. Perceptions were measured with one item each.

than quantitatively different for the females in this sample, particularly with respect to the advanced level skills. In any event, these questions regarding gender differences in computer self-efficacy deserve more attention in future investigations into the measurement of self-efficacy judgments.

Implications and Directions for Future Research

Additional validity studies using the CSE are currently underway or being planned. Such plans include an analysis of the factor structure invariance of the CSE over male and female grouping conditions. This type of confirmatory analysis should provide additional insight into the nature of the gender differences noted in this study. Also, research studies employing actual measures or observations of performance, effort expenditure, and persistence will further explore the predictive validity of the three types of efficacy judgments generated by the CSE. Finally, another research study will be looking at the relative contributions of both attitudes toward computers and computer self-efficacy to subsequent performance.

If these studies lend additional empirical support to the reliability and construct validity of the CSE, it should prove helpful for diagnosing group instructional needs and evaluating the effectiveness of instructional programs.

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Appendix

Table A-1

Simple Correlations Among Variables (N=392)

	VARIABLE										
Variable	Age	Sex	Ed. Level	Use	Difficulty	Control	Ability	Effort	CSE (I)	CSE (II)	CSE (III)
Age	1.000	-.009	.175	-.034	-.028	.118	-.100		-.030		
Sex		1.000	-.172	-.138	.004	-.015	-.101		-.176	-.302	-.215
Ed. Level			1.000	.157	-.021	-.037	.014		.024		
Use				1.000	-.014	-.133	.194		.455		
Difficulty					1.000	.232	-.169		.071		
Control						1.000	-.480		-.250		
Ability							1.000		.412		
Effort								1.000	.227	.295	.139
CSE (I)									1.000	.819	.406
CSE (II)										1.000	.561
CSE (III)											1.000